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10/509,850	09/30/2004	Gerard Barbezat	015258-063900US	4308

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EXAMINER

BAREFORD, KATHERINE A

ART UNIT

PAPER NUMBER

1762

DATE MAILED: 03/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/509,850

Applicant(s)

BARBEZAT ET AL.

Examiner

Katherine A. Bareford

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 9/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Specification*

1. The disclosure is objected to because of the following informalities: (1) at page 1, line 7; page 3, line 13; and page 4, lines 6 and 9; applicant needs to remove references to the claims. (2) headings, such as BRIEF DESCRIPTION OF THE DRAWINGS, SUMMARY OF THE INVENTION, etc. should be provided where appropriate in the specification.

Appropriate correction is required.

### *Claims*

2. Please note that (1) in claim 2, lines 2-3, "which is used, for example, in a gas turbine" does not further limit the claim as the terminology is optional. In claim 2, line 4, "preferably values of at least 100  $\mu\text{m}$ " does not further limit the claim as the terminology is optional. (2) In claim 3, lines 3-4, "preferably between 100 and 800 Pa" does not further limit the claim as the terminology is optional. In claim 3, line 8, "in particular a mixture of argon Ar and helium He" does not further limit the claim as the terminology is optional. In claim 3, lines 8-9, "with the volume ratio of Ar to He advantageously lying the range of from 2:1 to 1:4" does not further limit the claim as the terminology is optional. In claim 3, lines 11-12, "preferably between 10 and 40 g/min" does not further limit the claim as the terminology is optional. In claim 3, lines 13-14, all of part "d)" does not further limit the claim as the terminology is optional. (3) In claim

4, lines 3-5, "with such a component being in particular . . . an oxide of the said rare earths" does not further limit the claim as the terminology is optional. (4) In claim 5, line 4, "preferably between 3 and 35  $\mu\text{m}$ " does not further limit the claim as the terminology is optional. In claim 5, lines 5-6 "with in particular spray drying. . . powder particles" does not further limit the claim as the terminology is optional. (5) In claim 7, lines 2-3, "in particular a heat insulating layer" does not further limit the claim as the terminology is optional. (6) In claim 8, line 6, "preferably between 25 and 150  $\mu\text{m}$ " does not further limit the claim as the terminology is optional. In claim 8, line 7, "in particular at least in part" does not further limit the claim as the terminology is optional. In claim 8, lines 8-9, "which preferably has an either dense, columnar, directional or unidirectional structure" does not further limit the claim as the terminology is optional. In claim 8, lines 10-12, all of part "b)" does not further limit the claim as the terminology is optional (in line 4, "and/or a cover coating" can be present). In claim 8, line 11, "preferably between 10 and 30  $\mu\text{m}$ " does not further limit the claim as the terminology is optional. In claim 8, lines 11-12, "which in particular consists at least in part of the . . . insulating coating" does not further limit the claim as the terminology is optional. In claim 8, lines 13-14, <sup>1</sup>all of part "c)" does not further limit the claim as the terminology is optional. (7) In claim 9, lines 3-4, "in particular the base body consists of an Ni base alloy or of a Co base alloy" does not further limit the claim as the terminology is optional. (8) In claim 11, line 3, "namely a turbine vane, in particular a guide vane or a turbine blade" does not further limit the claim as the

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terminology is optional. In claim 11, line 4, "for example a heat shield" does not further limit the claim as the terminology is optional.

### *Claim Objections*

3. Claim 7 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

As worded, claim 7 is not limiting of parent claim 1 because the only feature not provided by claim 1, "in particular a heat insulating layer" is suggestive, and does not actually provide a requirement to the claim.

4. Claims 1 and 3<sup>are</sup> objected to because of the following informalities: (1) in claim 1, line 3, "PA" should be "Pa" for a proper description of the unit. (2) in claim 3, line 6, "Kw" should be "kW" for a proper description of the unit.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, line 4, "defocusing" should be "which defocuses" to grammatically clarify what occurs.

Claim 1, line 5, "a plasma with" should be "the plasma has", because antecedent basis for the plasma is provided at line 3 of the claim.

Claim 1, lines 9-10, "low-material transitional zones" is unclear as to what is meant by "low-material" and what is required.

Claim 3, lines 5-6, "has to be determined empirically and which, according to experience, is in the range of from 40 to 80 Kw" is unclear as to what is required. Is applicant claiming the range or is it merely optional? For the purposes of examination, the Examiner is treating the range as optional.

Claim 5, line 4, "lies to a substantial amount" is unclear as to how much must be in the range to be considered "a substantial amount".

Claim 7, line 1, "Use of the" should be "A" and a positive recitation of providing the described coating should be provided, as the claim is a further method claim.

Claim 8, line 1, "Use in" should be "A" and a positive recitation of providing the claimed features should be provided, as the claim is a further method claim.

Claim 10, line 1, this claim should either depend from claim 9, if a product claim is intended or be a method claim depending from claim 8 as parent claim 8 is a method claim and the claim is not in product by process format.

Claim 10, lines 1-2, as a component claim this claim is not further limiting as no structural requirement is provided.

Claim 11, line 1, this claim should either depend from claim 9, if a product claim is intended or be a method claim depending from claim 8 as parent claim 8 is a method claim and the claim is not in product by process format.

The other dependent claims do not cure the defects of the claims from which they depend.

### *Double Patenting*

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. Claims 1-11 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 4, 5, 9 and 12 of copending Application No. 10/835,358 in view of Muehlberger (US 5853815).

Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of 10/835,358 provide overlapping requirements as to the claims including the injection of coating material into a plasma (claim 2), partial or complete evaporation of the coating material, and the structural features (claim 12 – columnar). While the claims of 10/835,358 does not teach the substrate material, layer features and low pressure plasma features, Muehlberger teaches that a conventional system for plasma production for coating is a low pressure plasma spraying system for coating metallic substrates with a pressure of desirably 0.001 to 10 Torr (0.133 to 1333 Pa). Column 7, lines 20-50 and column 8, lines 50-55. The plasma gas can include Ar/He mixtures. Column 10, lines 20-30. The gas flow can be 267 SCFH or 126 SLPM. Column 10, lines 20-30. The powder delivery can be 2.61 lbs/hr or 19.71 g/min. Column 10, lines 50-55. The coating can be from multiple layers. Column 10, lines 55-65. The coating can be 0.0011 inch thick (approx. 27 microns). Column 11, lines 1-5. The particle size can be 5-8 microns. Column 10, lines 50-55. It would have been obvious to one of ordinary skill in the art to modify 10/835,358 to use the low pressure plasma system and features as suggested by Muehlberger to provide the plasma with an



expectation of desirable results, because 10/835,358 teaches treating performing a coating and evaporation process where particles can be injected into a plasma, and Muehlberger teaches a conventional plasma system for coating. As to the multilayers and heat insulation and bond coat layers, the Examiner notes that 10/835,358 teaches at claim 5 the use of materials well known in the art as bond coat and heat insulation materials and also teaches heat insulation at claim 12 and furthermore it is the Examiner's position that it is well known in the art to apply such materials to gas turbine components.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### *Claim Rejections - 35 USC § 103*

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under

37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maxwell (US 5824423) in view of Muehlberger (US 5853815) and Marszal et al (US 5792267).

Maxwell teaches the desire to provide thermal barrier (heat insulation) coatings on substrates such as turbine blade and vane airfoils. Column 1, lines 5-20. The substrate is, for example, a nickel or cobalt based superalloy. Column 7, lines 15-30. A metal bond coat is applied to the substrate by a method such as low pressure or vacuum plasma spray. Column 7, lines 30-60. A heat insulation ceramic top coat is applied over the bond coat. Column 7, line 55 through column 8, line 10. The ceramic top coat preferably has a columnar microstructure, which can be provided by various PVD methods. Column 8, lines 1-10.

Claim 2: the substrate can be a turbine blade. Column 1, lines 10-15. The ceramic coating can be 80-350 microns thick. Column 9, lines 10-20. The coating system has a plurality of layers. Column 9, lines 10-15.

Claim 4: the ceramic top coat for such thermal barrier coatings is taught to commonly be zirconium oxide that can be fully or partially stabilized with yttrium. Column 2, lines 25-35.

Claim 7: a coating is produced with a columnar structure. Column 8, lines 1-10.

Claim 8: the ceramic top coat coating forms a heat insulating (thermal barrier) coating. Column 7, line 65 through column 8, line 10. The coating system also includes a base, or bond coating, between the substrate and the ceramic coating. Column 7, lines 25-45. The bond coating thickness can be 40-120 microns. Column 9, lines 10-20. Maxwell teaches that it is known in such systems to use M Cr Al Y coating. Column 2, lines 10-30.

Claim 9: a coated component is provided by the process of claim 1. The substrate can be a nickel or cobalt based superalloy. Column 7, lines 15-30.

Claim 10: after coating, the coated component can be subjected to a thermal processing cycle at approximately two hours at about 1080 degrees C. Column 6, lines 5-15.

Claim 11: the substrate can be a turbine blade, etc. Column 1, lines 10-15.

Maxwell teaches all of the features of these claims except (1) the low pressure plasma spraying with evaporation to produce the claimed structure (claim 1), (2) the low pressure plasma spraying features (claim 3), (3) the laser scattering to determine powder particle size and its size (claim 5), (4) the additional heat source (claim 6).

However, Muehlberger teaches a plasma spray system for forming coatings of metallic oxides or other materials on metallic substrates. Column 1, lines 10-15. The system provides for low pressure plasma spraying where powder beam source is mixed with and becomes entrained with the plasma stream, where the powder particles heat to

near melting. Column 7, lines 20-30 and column 8, lines 30-55. In such a system, a pressure of desirably 0.001 to 10 Torr (0.133 to 1333 Pa) is used. Column 7, lines 20-50 and column 8, lines 50-55. The power used can be up to 100 kW, including 84.6 kW. Column 10, lines 15-30. The plasma gas can include Ar/He mixtures. Column 10, lines 20-30. The gas flow can be 267 SCFH or 126 SLPM. Column 10, lines 20-30. The powder delivery can be 2.61 lbs/hr or 19.71 g/min. Column 10, lines 50-55. The coating can be from multiple layers. Column 10, lines 55-65. The coating can be 0.0011 inch thick (approx. 27 microns). Column 11, lines 1-5. The particle size can be 5-8 microns. Column 10, lines 50-55. An additional heat source can be provided to preheat the particles to a predetermined temperature before injecting. Column 9, lines 15-30.

Marszal teaches that a conventional coating apparatus in the form of a low pressure plasma spray system can be used to vaporize coating and perform a PVD coating (physical vapor deposition) on a turbine blade. Figure 3 and column 3, line 45 to column 4, line 5. Plasma gun 64 is provided that produces a high temperature flame that vaporizes particles metered through the nozzle 66. Column 3, lines 60-65. The resultant mist coating<sup>s</sup> the exposed portions of the blade. Column 3, lines 60-65.

It is the Examiner's position that it is well known to determine size distribution of powder particles using a laser scattering method. If applicant disagrees, he should so indicate on the record in response.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Maxwell to provide the columnar ceramic top coat using

a PVD system provided by vaporizing particles in a low pressure plasma spray system as suggested by Muehlberger and Marszal in order to provide a desirable columnar coating, because Maxwell teaches that a columnar ceramic top coat applied by PVD is desired on a turbine blade, and Marszal teaches that it is known to use a conventional low pressure plasma spray system to provide PVD coating of a turbine blade and Muehlberger teaches conventional operational features of a low pressure plasma spray system, including the pressure, process gas, gas amounts, delivery rates, etc and the preheating of the particles. The combination of references would provide the desired evaporation, since for the vapor deposition, substantially more than 5 % of the particles would be melted and vaporized (reaching 100 %). The structure of the coating would be columnar, as desired by Maxwell, which would provide the anisotropic microstructure required. The elongate particles and transitional zones would inherently result from the deposition process, as all features required by the claims to achieve such a structure are provided. It further would have been obvious to modify Maxwell in view of Muehlberger and Marszal to perform laser scattering to determine the particle size distribution of the powder to be used in order to optimize the size of particles used, because Maxwell in view of Muehlberger and Marszal provides using a very narrow particle range of 5-8 microns, and one of ordinary skill in the art would be suggested to use a well known size distribution checking method, such as laser scattering, to confirm that the particle size is within the desired range in order to provide the exact coating desired.

12. US 2004/0234687 is the US publication of 10/835,358.
13. Japan 59-70757 teaches that a ceramic film formed with a columnar structure can be formed with columnar crystals grown in a direction perpendicular to the surface of the substrate by a plasma spraying process. See the Abstract.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
KATHERINE BAREFORD  
PRIMARY EXAMINER